

ABSTRACT

An improved composition and method for cleaning the surface of a semiconductor wafer are provided. The composition can be used to selectively remove a low-k dielectric material such as silicon dioxide, a photoresist layer overlying a low-k dielectric layer, or both layers from the surface of a wafer. The composition is formulated according to the invention to provide a desired removal rate of the low-k dielectric and/or photoresist from the surface of the wafer. By varying the fluorine ion component, and the amounts of the fluorine ion component and acid, component, and controlling the pH, a composition can be formulated in order to achieve a desired low-k dielectric removal rate that ranges from slow and controlled at about 50 to about 1000 angstroms per minute, to a relatively rapid removal of low-k dielectric material at greater than about 1000 angstroms per minute. The composition can also be formulated to selectively remove a photoresist layer, leaving the underlying low-k dielectric layer essentially intact.